

DOCKET NO. SA-228

EXHIBIT NO. 17B

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

HAZARDOUS MATERIALS GROUP CHAIRMAN'S FACTUAL REPORT
ATTACHMENT 11

*BATTERIES & BATTERY-POWERED DEVICES: AVIATION INCIDENTS
INVOLVING SMOKE, FIRE OR EXPLOSION*

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BATTERIES & BATTERY-POWERED DEVICES
Aviation Incidents Involving Smoke, Fire or Explosion
(Updated **March 9, 2006**)

DATE/ SOURCE	TYPE OF BATTERY	DEVICE	AIRCRAFT	INCIDENT SUMMARY
3/03/06 FedEx incident report	Lithium ion button cells, mfr. by Lixing		Cargo	US-bound package was noticed to be smoking at outbound FedEx station in Shenzhen, China. Upon inspection, the package of lithium ion batteries was discovered to be on fire.
2/23/06 FAA Special Agent statement	Nickel Metal Hydride (NiMH)		Cargo	During cargo sort operations in Memphis, FedEx personnel discovered a smoking fiberboard box. Four boxes contained 250 Nickel metal hydride batteries. Four of the batteries had short circuited. The fiberboard boxes apparently lost their structural integrity due to the weight of the batteries. The batteries were being shipped from London to St. Louis.
9/14/05	TBD (very large)	Batteries in metal racks	Cargo	During loading of outbound FedEx flight in Portland, ME, a package fell off the forklift and landed upside down. Sparks and a small fire were seen immediately. The cardboard outer packaging was removed exposing eight large batteries connected to each other inside a metal frame on a wooden pallet. Terminals were all exposed. Visible burn marks were on two of the batteries as well as on the crossbar of the metal frame. No package marking or labels indicated batteries. Documentation indicated the shipment contained solar panels and school supplies.
6/29/05	Lithium Ion	Battery-pack	Cargo	At UPS in Ontario, Calif., a package shipped from Shanghai containing a lithium-ion battery pack caught fire. No obvious signs of rough handling.
5/18/05	18 D-cell batteries	Marine buoy	Cargo	A FedEx employee in Fredericksburg, VA, was injured when a package that he was loading into a ULD exploded. The package contained a marine buoy powered by a battery-pack containing 18 D-cell batteries. Apparently some of the batteries had deteriorated causing gas to build up in a sealed container. Static electricity generated by sliding the box may have been the ignition source.
5/10/05	Dry cell / rechargeable	Portable drill	unknown	After being unloaded from a domestic flight a

				package caught fire due to the activation of a portable drill inside. DHL driver suffered smoke inhalation and was treated at a hospital.
03/25/05	Twenty-four 9-volt Energizer Industrial batteries	None	Passenger	TSA screeners discovered smoldering batteries in a passenger's checked baggage. They discovered 24 9-volt batteries, most of them packed loosely inside a cardboard box in the baggage. Only nine of the batteries had their terminals protected (with plastic caps or electrical tape). There were other loose metal objects in the box that apparently came in contact with the terminals one metal object was visibly charred. At least one of the batteries was still hot to the touch.
02/11/05	Lithium battery, solid cathode, manufactured by Eagle Picher of Surrey, BC, Canada.	None	Cargo	An undeclared package containing 18 lithium batteries caught fire while being unloaded from a conveyor belt at the FedEx facility in White Bear Lake, MN. The shipment had flown from Los Angeles to Minneapolis and was to be trucked to Clear Lake, WI. Only one battery caught fire
10/29/04 Greensboro FSDO briefing paper and media accounts	Ultralife 9-volt lithium (traditional 9-volt form: rectangular with two terminals on top)	Small electronic device (details to come)	Passenger (Charter)	Shortly after departure, the battery exploded in the hand of a cameraman traveling on the VP campaign plane of Sen. Edwards (the cameraman reportedly was in the process of changing batteries). It spewed shrapnel and ignited a fire in the seat which was extinguished by flight attendants and others. The flight crew declared an emergency and returned to Raleigh-Durham airport without further incident.
9/14/04 FAA field agent initial report	Two 12-volt, nonspillable, sealed rechargeable lead-acid batteries		Cargo	One of the batteries was packaged so that its terminals were able to come into contact with metallic sensor tape that was packed with it. This resulted in a short circuit and fire discovered at the Greenville-Spartanburg FedEx facility after the flight.
9/4/04 FAA incident summary statement	Dry, Alkaline, C-cell, (four)	Diving flashlight	Passenger	Diving flashlight exploded at LAX as it was removed from checked baggage by TSA personnel during the CTX screening process. Minor injuries to nine people. The incident occurred prior to the baggage being loaded on the passenger aircraft. A 1996 NIOSH report indicates that exploding flashlights are not uncommon—particularly among airtight flashlights with old, damaged, or improperly installed batteries. One of these batteries (Exp. Date: MAR 2005) may have been improperly installed according to the FAA summary.

8/7/04 FAA incident summary statement	Lithium-ion	Lithium-ion batteries assembled together in a plastic case	Cargo	Prototype lithium batteries shipped under a competent authority approval from California to Europe apparently started a fire in a ULD during the loading process at the FedEx Memphis hub. Shipment may have been in violation of the approval. Details to come.
4/28/04 Incident report #2004050033	Dry batteries		Cargo	While unloading a container in Dothan, AL, a FedEx ground handler smelled burning plastic. The package was located and opened. Several dry batteries inside had wires attached. Plastic bag inner packaging was melted and inside of box showed burn marks.
4/18/04	Ni-Cad, 18-volt, rechargeable	DeWalt cordless power drill	Passenger	A power drill with battery attached was activated in checked baggage. Drill generated heat, setting fire to the bag and other bags on the luggage cart while waiting to be loaded on to the passenger aircraft.
4/1/04 Transport Canada	CR123 lithium batteries	Flashlight	Passenger	A flight attendant lent a passenger a flashlight which was recently purchased in Beijing. The passenger dropped the flashlight while it was on. Later the passenger put the flashlight in a seatback pocket. A few minutes later, the flashlight began to emit smoke and noxious fumes. The flashlight became so hot it could only be handled with oven mitts.
11/02/03	Ni-Cad, Ni-Methyl Hydride, and/or Lithium (according to label on computer)	Notebook computer – Toshiba Satellite model # 815-S129	Passenger	At security screening, a passenger's bag contained a computer bearing a warning label on the bottom near the battery compartment: "Warning: Hot base may cause burn. Avoid prolonged contact with bare skin." Battery compartment was extremely warm to the touch. Screener had passenger turn off computer.
10/25/03	PowerSonic Nonspillable, Lead Acid gel-cell, 12- volt, 35 AMP hours	Powered hand truck	Passenger	Powered hand truck accidentally switched on. Motor and battery generated heat and smoke in cargo compartment of pax aircraft forcing aircraft to return to gate.
8/1/03 FAA # 2003NE700110	Sanyo six nickel metal hydride battery pack		Cargo	Battery pack self-ignited and burned while in transit at the UPS facility in Brewer, Maine. Medical instrument vendor had sent a replacement battery pack to the shipper with written instructions to return the battery pack they were using which had been recalled because of potential problems with it overheating after charging.
06/09/03	Ni-Cad, 18-volt, rechargeable	Battery for DeWalt cordless drill – unattached	Passenger	As part of routine baggage screening it was noticed that the battery, packed loosely in a toolbox, was hot. The unattached drill battery with unprotected terminals had come in contact with metal objects in the toolbox.

06/04/03 Incident report # 2003060805	Non-spillable batteries	None	Cargo	Package burst into flames at FedEx sort facility. Terminals not protected from short circuit, arced and started fire.
8/12/02 Incident report #2002090134	Lithium battery (excepted)	Samsung mini computer (palm pilot)	Cargo	Burning odor detected by handlers at the Los Angeles FedEx inbound package sort center. Battery apparently short-circuited causing the bubble wrap in the package to burn and melt onto the unit.
04/12/02 Incident report #2002050519	Lithium batteries	None	Cargo	Lithium batteries shipped under exception by Abbott Labs did not have terminals protected from short circuit. Started fire inside package at FedEx Indy sort facility.
3/25/02	Hawker Cyclon, sealed lead, rechargeable, nonspillable batteries	Cyclon batteries contained in larger battery: Lucent/Hawker, sealed lead, rechargeable, 45-volt, 2.5-Amp Hour	Cargo	After the initial flight, the package containing the battery/batteries caught fire at the FedEx sort facility in Memphis.
5/9/01 Incident report #2001061356	Wet acid batteries, nonspillable, two 6-pound batteries		Cargo	Shipment was being unloaded from of inbound aircraft when handlers noticed fumes and smoke. Package was located and had a burn hole on its side. Batteries apparently short-circuited.
2/26/01	Wet nonspillable battery	Portable welder	Cargo	After air transport and in route to final destination, UPS truck driver observed smoke coming from the trailer. Package had been undeclared.
11/03/00 EIR # 2001NM71004 4	Hawker lithium sulphur dioxide batteries	None	Cargo	While in route by road to the FedEx Cargo facility in Portland, OR, a lithium battery shorted and ruptured, burning its packaging. The shorted battery had long flexible protruding positive and negative terminals. Two FedEx drivers were treated at a hospital after inhaling fumes from the incident.
10/25/00 incident report #20010043	Hawker Cyclon, 2-volt, nonspillable	None	Cargo	Eleven batteries (approx. D-size), with positive and negative terminals on the same end were packed loosely in a box. They shorted and caught their packaging on fire. Discovered at FedEx cargo sort center in Ft. Worth after first flight.
9/7/00 Incident report #2000091202	Rechargeable sealed lead acid battery	None	Cargo	Handlers at Fedex outbound center in Raleigh, NC, noticed the package had an odor. Package was opened. Discovered slight smoke and two battery wires that had melted.
07/23/00	Nonspillable wet batteries	None	Cargo	One package discovered leaking; another

DOT 5800				displayed evidence of electrical shorting. Outer packaging marked "Batteries, wet, nonspillable"
07/21/00	Four AA or AAA batteries	None	Passenger	During unloading of checked baggage off flight from Miami to Ecuador, handlers discovered a bag containing several battery-powered gifts destroyed by fire started by pack of small batteries. Bag also contained broken bottle of cologne.
07/06/00 DOT 5800	20 nonspillable lead acid batteries	Cables attached to terminals; related power supply equipment	Cargo	Ramp personnel handling the shipment noticed that several of the batteries were sparking or arcing while being moved and that the terminals on the batteries were not sealed properly. Subsequently discovered that some of the cables normally interconnecting batteries still attached to terminals. Also, related equipment, switching panel and controller placed directly on top of batteries. Outer package marked "12-volt BAT-0048 Sealed, no maintenance rechargeable battery for UPS applications."
02/11/00 ANM EIR# 2000NM-710146 DOT 5800 200002135	Two PowerSonic, sealed rechargeable, lead acid batteries, 12-volt, 7 Amp Hr.		Cargo	Ramp workers noticed a burning smell emanating from a box after aircraft unloaded. Employees opened box and discovered two sealed lead acid batteries packed together without protection from short circuiting. Terminals of both batteries were partially melted and scorch marked. Battery cases were significantly warped and cases bubbled.
01/26/00 DOT 5800 2000021369	Eight nonspillable wet batteries	None	Cargo	Package broke open in cargo facility. Two batteries shorting when discovered. Little post on battery described as practically burned off. Paper packing material had black scorched spots. Terminals not protected against short circuits.
12/17/99 DOT 5800 2000010495	Four batteries	Uninterruptible power source (UPS)	Passenger / Cargo	Four automotive-size batteries inside the metal cabinet, wired in sequence by battery cables. Appears batteries not adequately secured within cabinet, shifted during handling and appear to have shorted out against the metal cabinet, causing burning. Outer container, a fiberboard box on a skid, showed signs of burning.
09/12/99 DOT 5800	Nonspillable battery (non-regulated or undeclared)	None	Cargo	Box found smoking during sort process. Battery had its posts bent inside the box. Posts allegedly came into contact with the metal slide in the sort, allowing the arc to occur and resulting in fire.
09/12/99	Nonspillable batteries (undeclared)	None	Cargo	During unloading of FedEx ULD in Denver, box discovered allegedly emitting smoke

DOT 5800 19990913126				Report indicates box containing 2 rechargeable, lead-acid batteries caught on fire.
08/31/99 DOT 5800 1999091333 and FAA 1999EA- 610653	Nontoppable battery (undeclared)	None	Cargo	During outbound package sort, battery apparently initiated and caught fire. There were holes burned completely through the fiberboard box closures.
08/24/99 Taiwan Aviation safety Council report # ASC-AAR- 00-11-001 Accident Investigation Report	12v motorcycle battery		Passenger	UNI Air passenger flight from Taipei to Hualien. Upon landing there was explosion then smoke and fire in the forward part of the passenger cabin. Investigators found that a motorcycle battery and container of gasoline had been brought into the passenger cabin. It is believed the gasoline leaked from its unmarked plastic bottle onto the battery causing a short circuit and fire. The aircraft was destroyed by fire. 14 passengers suffered critical injuries, 14 passengers suffered minor injuries.
7/24/99 DOT 5800 #1999081536	12-volt battery	Connected to a phone jack	Passenger	America West ramp agents noticed smoke coming from a piece of luggage that was on the belt loader (transferring from inbound flight to outbound flight). Bag was removed and firefighters called. There was visible melting and charring of a wire connected to the negative terminal of the battery.
06/07/99 DOT 5800	"Non-regulated" batteries. Actual type unknown.	None	Cargo	Package noticed during FedEx operation in Greensboro, NC to have burning smell. Inner batteries apparently arced causing batteries to burn inside the package. Incident report stated batteries had not been packaged correctly.
06/99 NASA ASRS Report	Camcorder battery	Possibly Camcorder	Passenger	During ground maintenance delay, flight attendant noticed burning smell. Passengers deplaned. Overhead bin opened to reveal smoke from a passenger bag. Upon opening, cloth items discovered to be smoldering, and a camcorder battery in the bag was extremely hot.
06/04/99 AEU and AEA msgs	Dry cell batteries	None	Cargo	U.S. cargo air carrier transported shipment containing batteries and gas cartridges to foreign destination. Fire broke out as cargo being offloaded and smoking pallet discovered. Examination of the pallet revealed steel rods placed on top of the dry batteries loosely piled on the pallet.
04/28/99	Lithium batteries	None	Passenger	After shipment (two pallets/120 000 batteries)

AWP report/ NTSB Rec. A-99-85	(non-regulated)		aircraft /cargo	transferred from passenger flight to cargo facility, fire occurred. Cargo employee possibly mishandled one of the two pallets. One pallet caught on fire, was moved, the second pallet then caught fire. Initial attempts to extinguish the blaze using water/chemical fire extinguishers failed.
10/29/98	Unknown	UPS	Cargo	Awaiting NTSB recommendation DCA-99-MZ-002 for details
10/10/98 AAL SA statement	Unknown	336 laptop computers	Cargo	Fire warning diverted cargo aircraft. Captain/flight engineer inspected cargo area. Both noted heat rising between pallets on jet flat, as well as strange odor and lung irritation. Fire fighters sprayed pallet with retardant. No further evidence of heat exposure or fire.
10/03/98 DOT 5800 1998100548	Nickel cadmium batteries (non-regulated)	None	Cargo	Two batteries somehow arced and short-circuited. This malfunction started a fire inside the box. The fire self-extinguished.
07/07/98 Rapid City SD Incident Report 98-002106	9-volt battery	Baby Monitor Remote	Passenger checked bag	Fire damaged bag discovered during unloading. Carrier employee noted fire odor and bag felt warm. Fire appeared to have been caused by a short in the remote, possibly because of close proximity to luggage frame.
05/19/98 DOT 5800 1998071744	Wet acid battery		Cargo	Sort center employee smelled unusual odor coming from container during unloading. A 70-lb package singled out and opened by emergency responder. Fanny pack burned and corroded, hot and smelled of fumes.
05/19/98 EA19980082	Unspecified batteries	UPS units (2)	Cargo at IAC warehouse	One of the UPS units exploded during offloading of a truck.
3/12/98	Wet batteries	Engines		Ramp agent at Miami Int'l airport noticed flames and smoke coming from one of the pallets during unloading after a flight from the Netherlands. One of the engine batteries was not protected and had come into contact with a steel cable causing the cable to spark and burn.
11/25/97 ASW investigation FAA press release 9/9/98	Nonspillable wet electric storage batteries	None	Intended as cargo on passenger aircraft	Courier company dispatched driver to pick up package consignment consisting of global positioning system-based survey equipment. Package self-ignited, smoked and burst into flames. An entire CO2 chemical extinguisher could not extinguish the fire, so firefighters applied dry chemical extinguisher. The FAA, NASA and the city arson bureau analyzed the fire and determined that it was caused by cables placed directly on top of battery.

11/13/97 ASO Investigation 98S0730067	Nontestable wet batteries	UPS	Cargo	During cargo sort operation, this shipment was discovered burning. The device consisted of a battery with associated circuitry. A subsequent failure analysis report revealed that the burning initiated in a printed circuit board, with the battery acting as the source of energy.
05/15/97 AEA security Summary BUF-97-017	Dry cell batteries	None	Cargo	As cargo being offloaded from aircraft, ramp employee noticed open, empty box in cargo bin. Then the employee noted four batteries on floor, which sparked as she attempted to pick them up.
01/28/97 AEA 97EA710078	Nontestable batteries (16)	Battery backup cabinet (UPS?)	Passenger aircraft as cargo	16 nontestable batteries were part of an extended battery cabinet used as backup power for computers. The package ignited while being delivered after transport aboard a passenger aircraft.
9/26/96 DOT 5800 #1996110343	Lithium batteries	None	Cargo	Eight lithium batteries were connected in a series and packed with bubble wrap inside a plastic express envelope. There were exposed connections on one end and loose wires on the other end. The batteries were not secured from movement within the package and a short-circuit resulted causing the packaging to burn. Burnt package discovered at Airborne sort center after first flight and prior to trans-Pacific cargo flight.
06/09/96 DOT 5800 960700024	Nickel cadmium battery	Power pack belt, lamp	Passenger Checked bag	One of three passenger checked bags discovered smoldering and burning in air carrier baggage make-up area. During bag handling, power pack belt had button pushed into "on" position, causing high intensity lamp in bag to power up. Heat from lamp set bag on fire.
03/19/96 DOT 5800 960401424	Hawker Cyclon, sealed-lead rechargeable batteries. (1000)	None	Cargo	Fiberboard box top came unsealed. Box contained rechargeable batteries. Terminals on loose batteries connected, causing them to arc, catching the box on fire and igniting surrounding freight. This box was one of ten pieces in the shipment. Other boxes were located and loose batteries repacked prior to movement to hazmat area. Each box contained two layers of 50 batteries each. Inner packagings consisted of batteries separated by cardboard dividers with layer of styrofoam sheeting across the top. Packaging tape on outer box failed.
02/20/96 ASO investigation	Lawn-mower batteries (declared)	Lawnmower	Cargo	Shipment consisting of 106 boxes (each containing a battery-powered lawn mower) was offered for transport to various destinations. Air carrier employees

FAA press release 3/3/98				discovered smoke coming from one box. Lawn mower battery had become dislodged and shorted out, causing the mower's wires, plastic housing and battery to burn/melt. Subsequent recall of all boxes revealed that more than 50 of the batteries had short-circuited and several had burned enough to char the boxes in which they were being shipped.
02/07/96 DOT 5800 19960300554	Wet acid batteries (undeclared)	None	Cargo	Package failure caused battery terminals to come into contact with metal slide, resulting in short circuit and sparks/fire. Heat generated melted the batteries.
11/18/95 DOT 5800 #1995120471	Wet cell battery	Removed from electric wheelchair		Wet cell batteries were removed from passenger's wheelchair and packaged separately by airline staff. Battery cables were left attached to battery causing a short-circuit during air transportation. This melted the plastic bag inner packaging. Overheated battery then boiled over, releasing acid which was mostly absorbed by the absorbent packaging material but reached the outer fiberboard box packaging.
05/08/94 UK CAA DG Occurrence Report Database (G. Leach)	Duracell lithium batteries (excepted from ICAO regulation by SP A45)	None	Intended to go as cargo on passenger aircraft	Consignment of lithium batteries found emitting smoke in ULD during truck transport to LHR. Fire damage. Batteries were smaller in diameter than a dime and about 5 mm high. They had been tossed loosely into a box. Positive and negative terminals had "tails" which were prone to short circuiting.
03/20/91 DOT 5800 910404294	Nonspillable battery	None	Cargo	During air transportation, a package containing a nonspillable battery was discovered smoking in the upper deck cargo area. Aircraft rerouted for emergency landing.